

[CLAIMS]

1. A compatible optical pickup apparatus comprising:

a light source module having a first light source and a second light source which emit light rays of different wavelengths to record/reproduce data on/from recording media having different standards, the first light source for a DVD and the second light source for a CD, the light source module operating one of the first and the second light sources;

an object lens focusing light rays emitted from the operated light source to form an optical spot on a predetermined position of a recording surface of the recording medium;

a light splitting element transmitting a part of the light rays emitted from the light source and reflecting the remaining light rays to oppose to the object lens, the light splitting element transmitting all of the light rays reflected from the recording medium;

a collimating lens arranged on a light path formed between the light splitting element and the object lens to convert the light rays into parallel light rays;

a hologram module arranged on a light path between the collimating lens and the object lens to split a light which is incident to the recording medium, into 5 beams; and

a photodetector having a DVD sensor and a CD sensor for receiving light rays that are reflected from the recording medium and passed through the hologram module and detecting a information signal and an error signal.

2. The compatible optical pickup apparatus as claimed in claim 1, further comprising:

a monitor photodetector receiving light rays that pass through the light splitting element and monitoring the light rays to adjust a magnitude of the light emitted from the first and the second light sources; and

a sensor lens arranged on a front surface of the photodetector for adjusting the light rays reflected from the recording medium to be incident on the photodetector with a predetermined size.

5 3. The compatible optical pickup apparatus as claimed in claim 2, wherein the hologram module comprises:

a polarized light hologram formed in a circular pattern and splitting only predetermined polarized light rays; and

10 a 1/4-wavelength plate arranged on a surface of the polarized light hologram opposite to the object lens for turning a phase of the polarized light rays by 90°.

4. The compatible optical pickup apparatus as claimed in claim 3, wherein the polarized light hologram is divided into a first hologram and a second hologram which are operated in response to the light rays emitted from the first light source, the first and the
15 second holograms being formed on the same plane in a semicircular shape and located one on the other, the first and the second holograms diffracting the light by a predetermined angle with respect to an optical axis of the light to thereby generate zero-order and ± 1 order beams.

5. The compatible optical pickup apparatus as claimed in claim 4, wherein the zero-
20 order beam generated by the first and the second holograms is focused by the object lens on a predetermined position conforming to the standard of a DVD-ROM.

6. The compatible optical pickup apparatus as claimed in claim 4, wherein the -1

order beam generated by the first hologram and the +1 order beam generated by the second hologram are respectively focused by the object lens on predetermined positions conforming to the standard of a DVD-R/DVD-RW.

5 7. The compatible optical pickup apparatus as claimed in claim 4, wherein the +1 order beam generated by the first hologram and the -1 order beam generated by the second hologram are respectively focused by the object lens on predetermined positions conforming to the standard of a DVD-RAM.

10 8. The compatible optical pickup apparatus as claimed in claim 4, wherein the photodetector comprises 5 DVD sensors which correspond to the respective five split beams and are arranged apart from one another by a predetermined distance.

 9. The compatible optical pickup apparatus as claimed in claim 8, wherein, if a
15 DVD-ROM is used for the recording medium, a focus error signal and a tracking error signal generated at the photodetector by the astigmatism method and by the DPD (Differential Phase Detection) method, respectively, are calculated with respect to a signal of the zero-order beam which is reflected from the DVD-ROM and received at an associated DVD sensor.

20 10. The compatible optical pickup apparatus as claimed in claim 8, wherein, if a DVD-RAM is used for the recording medium, a focus error signal generated at the photodetector by the DAD method and a tracking error signal generated at the photodetector by one of the DPP and the PP (Push Pull) methods are calculated with respect to a signal of

the zero-order beam reflected from the DVD-RAM, a signal of the +1 order beam generated by the first hologram, and a signal of the -1 order beam generated by the second hologram, which are received at associated DVD sensors.

5 11. The compatible optical pickup apparatus as claimed in claim 8, wherein, if a DVD-R/DVD-RW is used for the recording medium, a focus error signal and a tracking error signal generated at the photodetector by the astigmatism method and the DPP method are calculated with respect to a signal of the zero-order beam reflected from the DVD-R/DVD-RW, a signal of the -1 order beam generated by the first hologram, and a signal of the +1
10 order beam generated by the second hologram, which are received at associated DVD sensors.

 12. The compatible optical pickup apparatus as claimed in claim 8, wherein, if a CD is used for the recording medium, a focus error signal and tracking error signal generated by the photodetector by the astigmatism and the PP method are calculated with respect to a
15 signal of light emitted the second light source which is reflected from the CD and received at the CD sensor.